Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Compiler Design **Semester: VI**
Program: B.Tech (CSE) with specializations IT Infra, BAO, CCVT **Time : 03 hrs.**
Course Code: CSEG3015 **Max. Marks: 100**

Instructions: All questions are mandatory.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain bootstrapping a compiler with suitable diagrams.	**4**	**CO1**
Q 2	Define S-attributed and L-attributed definitions. Give an example each.	**4**	**CO4**
Q 3	Briefly describe the language accepted by each of the following: (a) $10*1\|01*0$ (b) {+ abc | def }+	**2+2**	**CO1**
Q 4	Explain operator grammar and operator precedence parsing.	**4**	**CO2**
Q 5	Find the FIRST and FOLLOW of the non-terminals in the grammar $S -> aABe$ $A -> Abc\|b$ $B -> d$	**4**	**CO2**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Construct LALR parse table for the grammar $S -> CC, C -> cC\|d$	**10**	**CO2**
Q 7	Write two differences between the following: (a) Cross Compiler vs. Native Compiler (b) Single Pass Compiler vs. Multi Pass Compiler (c) Regular Grammar vs. Finite Automata (d) Front End Compiler vs. Back End Compiler (e) Compiler vs. Interpreter	**10**	**CO1** **CO3**
Q 8	(a) Consider the following expression and construct a DAG for it- 1. $a = b \times c$ 2. $d = b$ 3. $e = d \times c$ 4. $b = e$ 5. $f = b + c$	**10**	**CO5**

	6. $g = f + d$ (b) Optimize the above block.		
Q 9	What is an intermediate code? Explain different types of intermediate codes forms and represent the following statement in different forms: W = (A + B) – (C + D) + (A + B + C).	**10**	**CO5**
SECTION-C (2Qx20M=40 Marks)			
Q10	(a) Construct canonical LR(0) collection of items for the grammar below. $S \rightarrow L = R$ $S \rightarrow R$ $L \rightarrow * R$ $L \rightarrow id$ $R \rightarrow L$ Also identify a shift reduce conflict in the LR(0) collection constructed above. (b) Consider the following grammar- $S \rightarrow (L) \mid a$ $L \rightarrow L, S \mid S$ Construct the operator precedence parsing table using leading and trailing.	**(10 + 10)**	**CO2**
Q11	Consider the following basic block- **B10:** S1 = 4 x I S2 = addr(A) – 4 S3 = S2[S1] S4 = 4 x I S5 = addr(B) – 4 S6 = S5[S4] S7 = S3 x S6 S8 = PROD + S7	**(20)**	**CO4**

	PROD = S8 S9 = I + 1 I = S9 If I <= 20 goto L10 (a) Draw a directed acyclic graph and identify local common sub-expressions. (b) After eliminating the common sub-expressions, re-write the basic block. **OR**		
	(a) Test whether the grammar is LL(1) or not, and construct a predictive parsing table for following grammar: $S \rightarrow iEtSS1/\ a$ $S1 \rightarrow\ eS\ /\in$ $E \rightarrow b$	**10**	**CO2**
	(b) Explain all phases of compiler.	**10**	**CO1**